PRIZES PROPOSED BY THE PARIS ACADEMY OF SCIENCES FOR 1900.

THE Grand Prix des Sciences Mathematiques will be awarded in 1900 for an improvement, in any important point, of our knowledge of the number of classes of quadratic forms of two unknowns with entire coefficients; the Bordin Prize (3000 francs), for the development and improvement of the theory of surfaces applicable to the paraboloid of revolution; the Francœur Prize (1000 francs), for discoveries useful to the progress of pure or applied mathematics; the Poncelet Prize (2000 francs), for any similar work published during the last ten years.

In Mechanics: the Extraordinary Prize of 6000 francs will be given for any work increasing the efficiency of the French navy; the Montyon Prize (700 francs), for the invention or improvement of instruments useful to the progress of agriculture, the mechanical arts or sciences; the Plumey Prize (2500 francs), for improvements in steam engines or any invention contributing most to the progress of steam navigation.

In Astronomy: the Lalande Prize (540 francs) is offered for the most interesting observations, or work most useful to the progress of astronomy; the Damoiseau Prize (1500 francs), for a memoir on the theory of one of the periodic comets of which several returns have been observed; the Valz Prize, for the author of the most interesting astronomical observation made during the year; the Janssen Prize (a gold medal), for the most important discovery in physical astronomy; and an anonymous prize of 1500 francs, as an encouragement to the calculators of the minor planets, especially those discovered in the Nice Observatory.

In Statistics: a Montyon Prize of 500 francs, for a memoir on questions bearing on French statistics.

In Chemistry: the Jecker Prize (10,000 francs), for organic chemistry, and the Wilde Prize (4000 francs).

In Mineralogy and Geology: the Vaillant Prize (4000 francs) will be awarded in 1900 for a rigorous determination of one or more atomic weights, or for the study of alloys.

In Botany: the Barbier Prize (2000 francs) is intended to recompense whoever makes a valuable discovery in the medical, surgical, or pharmaceutical sciences, or in botany, in relation to the art of healing; the Desmazières Prize (1600 francs), for a memoir on the cryptogams: the Montagne Prizes (1000 francs and 500 francs), for work on the anatomy, physiology, development, or description of the lower cryptogams; and the Thore Prize (200 francs) to the author of the best memoir on the cellular cryptogams of Europe (algæ, mosses, lichens, or fungi), or on the anatomy of any species of European insect.

In Anatomy and Zoology: the Savigny Prize (975 francs), in aid of young travelling zoologists not receiving Government aid, more especially those occupying themselves with the invertebrates of Egypt and Syria; the Da Gama Machado Prize (1200 francs), for the best memoir on the coloured parts of the tegumentary system of animals.

In Medicine and Surgery: a Montyon Prize, for any discovery useful in the art of healing; the Bréant Prize (100,000 francs), for a specific antidote against Asiatic cholera, or for such a discovery of the causes of Asiatic cholera that those causes may be suppressed and the disease stamped out. The interest on the capital sum will be awarded for a rigorous demonstration of the existence in the atmosphere of materials capable of propagating epidemic diseases; the Godard Prize (1000 francs), for the best memoir on the anatomy, physiology, and pathology of the genito-urinary organs; the Parkin Prize (3400 francs), as a recompense for researches upon either the curative effects of carbon and carbon dioxide, or for the effects of volcanic action upon the spreading of epidemic diseases; the Bellion Prize (1400 francs), for works or discoveries especially profitable to the health of man; the Mège Prize, for a study of the causes which have favoured or retarded the progress of medicine; the Dusgate Prize, for the best work on the diagnosis of death, and on the means of preventing premature burial; the Lallemand Prize (1800 francs), for work on the nervous system; and the Baron Larrey Prize (1000 francs), for the best work treating of military medicine, surgery, or hygiene.

In Physiology: a Montyon Prize of 750 francs is offered annually; the Pomat Prize (1400 francs), for a determination of the principal anthropometric data; the Martin-Damourette Prize (1400 francs) and the Philipeaux Prize (890 francs), for work in experimental physiology. In Physical Geography, the Gay Prize (2500 francs), for the application to a portion of France, or a portion of the Alpine Chain, of the analysis of the geological circumstances which have determined the actual conditions of relief and hydrography.

Of the General Prizes, the following may be awarded in 1900: the Arago Medal, the Montyon Prize (unhealthy trades), the Cuvier Prize (1500 francs), the Tremont Prize (1100 francs), the Gegner Prize (4000 francs), the Delalande-Guérineau Prize (1000 francs), the Jérome Ponti Prize (3500 francs), the Tchihatchef Prize (3000 francs), the Boileau Prize (1300 francs), the Houllevigne Prize (5000 francs), the Cahours Prize (3000 francs), and the Saintour Prize (3000 francs).

GEOLOGY OF JAMAICA.[1]

THIRTY years have elapsed since the publication of the "Reports on the Geology of Jamaica," by James G. Sawkins and others, with an appendix by Robert Etheridge; a work published as one of the "Memoirs of the Geological Survey." In the work before us Mr. Robert T. Hill deals anew with the subject, his observations being based upon surveys made for Alexander Agassiz; and he has evidently spared no pains to investigate the geology and physical geography of the island in a thorough manner in accordance with modern knowledge. It is interesting to find him referring to the early paper written by De la Beche for the Geological Society in 1828 as "more in harmony with the conclusions to be presented by us than the subsequent and more extensive reports of the official surveys which supplanted them."

Mr. Hill considers that Jamaica presents a more favourable opportunity for detailed geologic investigation than any other tropical area. Highways, bridle-paths, and railways intersect the land in various directions, to say nothing of the coast-cliffs. Hence there is no lack of geological sections, and the author has had great advantages over those who preceded him. He remarks that the earlier researches "failed to solve the essential problems of the succession and age of the strata," and that the literature of no other region, especially that relating to palæontology, "presents so many erroneous conclusions." Curiously enough the author attributes this stratigraphic confusion, not to incompetence, but "to an act of Providence." It is well known that the original Director of the Jamaican Geological Survey, Lucas Barrett, was drowned in a diving-dress, and it is pointed out that the endeavours to interpret his opinions were the chief sources of subsequent erroneous conclusions. The stratigraphical errors were largely those of correlation, for it is admitted that otherwise the official reports were full of valuable data.

The author now starts afresh in naming and classifying the formations, using geographical terms, rather than those of a lithological or palæontological nature. The island is made up of Cretaceous, Eocene, Oligocene, Pliocene, and younger deposits, together with intrusive rocks. In adopting geographical names it would have been well, if possible, to have avoided the use of those names which are not original to the island, but are familiar elsewhere; to speak of the Jerusalem, Richmond, and Falmouth beds of Jamaica is at least unfortunate. So far as they go the Yallahs, Catadupa, and Manchioneal beds sound more appropriate, and the same may be said of the Bogue Island formation.

Evidence is given to show that locally the Cretaceous, Eocene and Oligocene formations were stratigraphically continuous, and we have a succession upwards from detrital to oceanic deposits. The higher Eocene beds contain *Cerithium*, *Lucina*, and Rudistes.

The white limestones of the Jamaican series are shown to represent several distinct ages, from Cretaceous to Recent, but the main mass belongs to the Oligocene. This mass forms the large plateau region which is really a dissected plain, rising in places to 3000 feet. It is known as "the cock-pit country," on account of the numerous swallow-holes, which vary from shallow circular basins to sink-holes 500 feet in depth. They are characterised by a bright red clayey soil, a residue from the dissolution of the limestone. Dykes of diorite and granitic rock penetrate Cretaceous, Eocene and Oligocene strata. The coastal deposits include various gravels, marls, and reef-beds of later Tertiary and Recent ages.

[1] "The Geology and Physical Geography of Jamaica: Study of a Type of Antillean Development." By Robert T. Hill, *Bull. Museum Comp. Zool. Harvard Coll.*, vol. xxxiv., 1899, pp. 256; with 41 plates. (Cambridge Mass.)

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The author discusses at some length the changes of physiography in tropical America, in their bearing on the history of the West Indian Islands. In Jurassic times there is evidence of a great expansion of land from the Rocky Mountains eastwards in North America, and over the north-eastern part of South America. "It is probable that the continental mass as a whole, practically equivalent in area to the present one, occupied a position slightly east of its present locus." The American fossiliferous marine Jurassic belonged to the Pacific area, and may have extended as far to the east as Havana. No evidence is recognised for establishing land connection between the islands and North and South American lands in Post-Jurassic time. The first evidence of Antillean lands is found in eruptive rocks of late Cretaceous time, when it is probable there were marine volcanoes. The land débris constituting the Eocene strata proves the pre-existence of extensive Cretaceous land-areas. In late Eocene and early Oligocene times there was a profound regional subsidence, and 3000 feet of purely oceanic deposits were accumulated. A great uplift occurred in late Oligocene or Miocene times, and subsequently many minor movements of elevation and depression have taken place.

In an appendix some Cretaceous and Eocene corals from Jamaica are described by Mr. T. Wayland Vaughan.

H. B. W.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

UNDER the will of Mr. James Brown Thomson, of Kinning Park, Glasgow, the University of Glasgow will receive 10,000*l*., and the Glasgow Technical College, 2000*l*.

MR. W. H. DERRIMAN, assistant lecturer in physics at the Technical College, Huddersfield, has been appointed to a similar post in University College, Liverpool.

Science states that Dr. Jokichi Takamine, of the University of Tokio, Japan, known for his researches on digestive ferments, is at present on a tour of inspection of the larger educational institutions of the United States. He has been sent by the Japanese Government to examine the scientific work and methods of American universities.

AN English Educational Exhibition will be held at the Imperial Institute on January 5-27. The exhibits will comprise students' work, and will refer to primary, secondary, technical, and higher education of both sexes. A series of lectures and conferences on educational subjects and demonstration lessons will be held at the Imperial Institute during the Exhibition. Particulars of the chief science conferences have already been given (p. 189).

THE *University Correspondent* has published its annual crop of amusing mistakes made by schoolboys in answers to examination questions. The following answers, selected from many similar ones, show how easy it is for pupils to receive inaccurate and confused impressions when given didactic instruction, and also how essential it is that examination questions should be explicit:—When would you expect an eclipse of the sun to take place? In the night.—The sun never sets on English possessions, because the sun sets in the west, and our colonies are in the north, south, and east.—The exports of Ceylon are peculiar to any other part of the world. The chief are piano steamers (sc. P. and O. steamers).—A cubic foot of water weighs 64 lbs. : .·. a squate foot of water weights 16 lb., and a foot of water weights 4 lb.—The three principle parts of the eye are the pupil, the moat, and the beam.—A mariner's compass is a little poast stuck up in the sea, and when people want to know the way, the ships go and look at it.—Many other instances might be given, but those quoted are sufficient to show that there is much room for improvement in the teaching of scientific subjects while such hazy ideas exist in the minds of schoolboys.

SCIENTIFIC SERIAL.

Symons's Monthly Meteorological Magazine, December, 1899.—The aims of meteorology. This is a brief synopsis of a "Report on the Meteorology of Maryland," prepared by direction of the U.S. Weather Bureau. The article on special observations and investigations enumerates twenty-nine heads under which observations are made. While all are useful in different ways, any single service dealing with one-third of them would have little energy left for the improvement of the important work of weather prediction. Mr. Symons considers that the perusal of the work, consisting of about a hundred pages, is not merely instructive as a guide to the future, but also very useful as a record of past progress.—Kites and meteorology, by W. A. Eddy. This is a statement, in chronological order, of the various occasions on which kites have been used in meteorological investigations, from those in 1749, by Wilson and Melvill, near Glasgow, and in 1836 by Admiral Bach in Hudson Strait, in sending up thermometers, to those very successful experiments made in recent years at the Blue Hill Observatory, by means of the Eddy and Hargrave kites.—The same number also contains some interesting notes on damage by lightning, injurious effects of fog on plants, and unusual snow crystals.

SOCIETIES AND ACADEMIES.

EDINBURGH.

Royal Society, December 19, 1899.—Prof. Duns in the chair.—Dr. J. Souttar McKendrick, of Glasgow, read a paper on the zymolysis of tissues, physiological and pathological. After a short bibliographical sketch of the nature and action of enzymes as they exist in the digestive juices, with their methods of extraction, and mention of the observations of Nasse, Brucke, and others who had attempted to demonstrate the presence of ptyalin and pepsin in muscle, the author described in detail his method of procedure. He made glycerine extracts of between sixty and seventy tissues of the rabbit, child, adult, and those obtained post-mortem, and with each tissue extractive he endeavoured to demonstrate the presence or absence of enzymes similar in their action to ptyalin or amylopsin, pepsin, trypsin, inversin and rennin. A series of extractives were also made from certain pathological tissues, namely, carcinomata, sarcomata, tissues from an eclamptic, &c. The results pointed to the presence of pepsin, or a substance analogous to it, in all the tissues, physiological and pathological; to the presence of a diastatic ferment in most of the tissues; to the absence of tripsin except in the pancreas; to the absence of a milk curdling ferment except in those tissues in which it is known to exist; to the absence of an inversive ferment. Malignant tissues were found to have proteolytic and diastatic properties. Though rabbit's blood contained no diastatic enzyme, eclamptic blood contained such an enzyme in large amount; and all eclamptic tissues yielded extracts with markedly diastatic properties. The author in conclusion advocated the similar examination of the blood in all obscure diseases and of carcinomatous and sarcomatous growth.—Prof. Mitchell communicated a paper on the cooling of a body in a steady blast of air, Part II. In the later experiments the air currents had been varied from 10 to nearly 1000 metres per minute, and the temperature had been carried up to 120° C. Newton's law of cooling under these conditions was found to hold with great accuracy, and Newton's original statement, imperfectly quoted by most writers, completely verified. The rate of cooling was shown to be proportional to the difference of temperature for a given strength of blast, and to be proportional (for a given temperature) to the strength of blast up to a value of about 450 metres per minute, but to fall off from the law of proportionality for higher values. This was explained as a result of unsteadiness in the air current at these higher values.—Dr. Mahalanobis described a new form of myograph, which consisted essentially of a T-shaped lever, pivoted so as to admit of horizontal movements free from the influence of gravity. The instrument was suitable for obtaining myograms of isometric and isotonic contractions of muscles, and most of the ordinary experiments on fatigue, tetanus, &c. The momentum of the lever during contraction of the muscle was approximately counterbalanced by the slight increase of tension in an elastic band, thus securing a fairly isotonic condition of the muscle.—Dr. C. G. Knott drew attention to the fact that Prof. Swan, of St. Andrews, had in 1859 constructed and used the form of photometer commonly associated with the names of Lummer and Brodhun, who described it in 1889. Swan's own description and figure will be found in the *Trans.* R.S.E., vol. xxii., 1861.—Prof. Tait, in a note on the claim recently made for Gauss to the invention of quaternions, showed that what Prof. Klein, both in the *Mathematische Annalen* and in his (and Sommerfeld's) treatise *Ueber die Theorie des Kreisels* ascribed to Gauss was not the Hamiltonian quaternion

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